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Traffic Accidents and Minor Tranquilizers: a Review

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Synopsis

Minor tranquilizers, including the benzodiazepines, have been found to impair driving skills such as hand-eye

coordination and reaction time. Several studies have also demonstrated an association between minor tranquilizer use and traffic accidents; however, the association may be due entirely to more frequent alcohol use or to the underlying anxiety found in users of minor tranquilizers. Whichever the case, patients taking minor tranquilizers do have higher accident rates. It is recommended that physicians emphasize the possible risks of driving while using these medicines, particularly if used with alcohol.

IN THE UNITED STATES, APPROXIMATELY 50,000 persons die annually in traffic accidents, which are the leading cause of death for both men and women between 5 and 35 years old. It has been estimated that one out of every two Americans will be involved in an injury-producing accident sometime in his or her life (1). Speeding, failure to use seatbelts, and consumption of alcohol are the major risk factors associated with traffic accidents (2). Drug intoxication, often illicit, has also been incriminated in the increasing mortality rates in the young. Because of widespread use and certain similarities to alcohol, minor tranquilizers, including benzodiazepines, have also been studied as a risk factor for traffic accidents.

Minor tranquilizers, which include nonbarbiturate sedatives and hypnotics as well as anxiolytics such as the benzodiazepines, are among the most commonly prescribed and utilized medications in developed countries. Skegg and coworkers found that 2.2 percent of a general practice population in England had been given a prescription for a minor tranquilizer within the previous 3 months (3). Dunnell and Cartwright estimated that 8 percent of adults in England had used a sedative, tranquilizer, or sleeping pill within the previous 24 hours (4). In the United States, Parry and coworkers found that 8 percent of men and 20 percent of women had taken a ben-

zodiazepine or other minor tranquilizer within the previous year (5). If these medications cause traffic accidents, their ubiquitous use may be a sizable but little advertised public health problem.

Driving Skills

Authors of several studies of motor skills and attention span have ascertained deficits in persons given benzodiazepines (6). Tests of saccadic eye movements, hand-eye coordination, and reaction time have also been found to be abnormal in persons taking benzodiazepines (7,8).

Driving tests may be better measures of actual driving performance. In members of the police force in Basel, Switzerland, Kielholz and coworkers found no effect from 20 mg of chlordiazepoxide in five different driving tests (9). However, this dose did potentiate the negative effect of alcohol (blood concentration, 80-100 mg per dl). Studying 100 young volunteers 18-30 years old, Betts and coworkers found that chlordiazepoxide given in five 10-mg doses over 36 hours impaired several driving skills (10). Drivers were often unaware of any deficits in driving skills due to the medicine. Betts and coworkers found no interaction with alcohol in doses of .5 gram per kg.

These studies suffer primarily from difficulty in generalizing the results to patients in actual driving situations. Persons taking these prescription drugs may have driving skills and responses to medication that differ from the study populations. It has also been suggested that medications that relieve underlying medical problems such as anxiety may actually improve driving performance (11).

Accidents and Tranquilizers

A number of studies of fatal accidents have described the prevalence of minor tranquilizers in victims' blood samples. In a 1967 study of 722 fatal accidents in California, 10 percent of the drivers had one of several psychotropic medications in their blood specimens (12). Benzodiazepines and barbiturates were most frequently found. Approximately 70 percent of those with psychotropic medications in blood specimens also had blood alcohol concentrations greater than 100 mg per dl.

In a study of more than 2,000 traffic accidents and careless driving violations in Germany, Wagner found age- and sex-related differences in medication use (13). The admitted use of sedatives within the previous 24 hours was highest in women 40–60 years old (8 percent). Only 1 percent of all 18–24-year-olds and 3 percent of those 25–40 admitted sedative use. Garriott and coauthors found that 10 percent of fatally injured drivers in Dallas in 1974–75 had diazepam or its metabolites in blood samples (14). Alcohol was also found in 53 percent of diazepam-related deaths (7 of 13).

Although rates of drug use in traffic accident victims are high, they appear to be of the same order of magnitude as in the general population (15). The absence of a control group in these traffic accident studies makes it impossible to estimate the risk of accidents. However, the frequent use of alcohol by drug users in the California and Dallas studies suggests that any association between drugs and accidents might be confounded by alcohol. In addition, the increasing prevalence of drug use with age, particularly by women, found in the German traffic accident data indicates that proper controls for these studies should be matched with cases for sex and age.

Case-control studies show a relationship between benzodiazepine use and traffic accidents. Honkanen and coworkers studied 203 survivors of traffic accidents who had gone to emergency departments within 6 hours of the accident, and they used motorists stopped at petrol stations as controls (16). Cases and controls were matched for weekday, hour, and location of the traffic accident. All persons identified as cases and 92 percent of those serving as controls were interviewed, and their blood samples were taken. The investigators found that accident victims were more likely than controls to have benzodiazepines in blood detected by gas-liquid chro-

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matography (cases, 10 of 203; controls, 7 of 325; $P = .03$).

Persons serving as controls in the study by Honkanen and coworkers were younger and more likely to be female than accident survivors. Alcohol use was not analyzed. As noted previously, these factors (age, sex, and alcohol use) may confound the association between minor tranquilizers and accidents. As a result, this study by Honkanen and coworkers must be considered suggestive but not conclusive that there is a causal relationship between accidents and minor tranquilizers.

In a prospective study, Skegg and coauthors reported on 40,000 patients of 16 general practices in England followed for up to 2 years (3). A total of 57 drivers involved in accidents resulting in death or hospital admission were identified. Exposure was defined as the prescription and dispensing of medication during the 3 months prior to the accident. A control group selected from the practices was matched for age, sex, and group practice. The use of minor tranquilizers was 4.9 times greater in the traffic accident group (95 percent confidence limits of 1.8–13). The effect of alcohol was not studied. The age- and sex-matching and prospective nature of this study eliminate much of the selection bias possible in other studies. However, the study team was not able to measure alcohol use in those serving as cases or controls, which might account for the increased risk. In addition, patients who had been prescribed minor tranquilizers might not have been taking them at the time of the accident.

One problem in interpreting this study is the role of underlying disease rather than medication as a contributing factor in motor accidents. Patients discharged from State mental hospitals in the United States have been noted to have higher accident and traffic violation rates than controls (17). Kastrup and coworkers found that former psychiatric inpatients in Denmark had higher accident rates, were more likely to be involved in multiple

accidents, and were more frequently intoxicated from alcohol at the time of accidents than the general population (18). Prospective studies of persons taking psychological tests have found higher accident rates in those persons with high aggression and anxiety scores (19).

These studies cannot be directly related to the type of patients receiving minor tranquilizers as outpatients. Nevertheless, one may formulate a reasonable hypothesis in which people with emotional problems respond poorly in dangerous traffic situations and as a result have more frequent accidents. Alternatively, they drink excessively, and their accidents may actually be due to the effects of alcohol.

Even though the study of Skegg and coauthors (3) cannot distinguish the role of medication from underlying disease or from use of alcohol, they pointed out that the cohort of patients prescribed minor tranquilizers is at increased risk of having a serious accident. They also recommended that these patients taking minor tranquilizers be cautioned about the hazards of driving.

Discussion

The association between minor tranquilizers and traffic accidents found in these studies requires further evaluation before definitive statements on causation can be advanced. Curtailing the use of benzodiazepines for appropriate indications appears unwarranted, given the present evidence. Anxious patients, untreated with minor tranquilizers, may in fact have higher accident rates than those now being treated. Further studies of the risks of untreated anxiety may in part address this problem. Special care must be made to analyze the confounding effects of alcohol, age, and sex in such studies. In addition, further studies of the association between minor tranquilizers and accidents with appropriate control for alcohol use are necessary.

Using seatbelts, driving at a speed appropriate for road conditions, and avoiding alcohol before driving are well-defined risk factors that can be altered.

The evidence suggests that in addition it is prudent to warn patients that their medication may affect their driving skills, particularly if they are also drinking. Driving while under the influence of minor tranquilizers should be avoided.

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